



Missouri Department of Natural Resources

Stream Survey Sampling Report

Hinkson Creek Stream Study Columbia, Missouri Boone County

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EXECUTIVE SUMMARY

The Missouri Department of Natural Resources, Water Protection Program placed a 14-mile segment of Hinkson Creek on the 1998 list of impaired waters designated under section 303(d) of the federal Clean Water Act, for “unspecified pollutants” due to urban runoff. A history of fish kills, the physical alteration of stream channels and adjacent riparian corridors, and other problems associated with urbanization has resulted in the designated beneficial uses becoming impaired. These urbanization concerns include the potential for water quality degradation, increased flow intensity due to stormwater runoff of impervious surfaces, and the likely detrimental effects of development on the stream channel and riparian areas.

Numerous scientific studies have indicated that urban streams are particularly vulnerable to water quality and habitat degradations. Water quality could be reduced by any number of factors: wastewater treatment plant discharges; accidental or deliberate spills; illegal dumping; and non-point runoff from parking lots, roadways, golf courses, lawns, etc. In addition, habitat losses often result from residential or commercial development.

Biological monitoring during the fall of 2001 and the spring of 2002 by the Environmental Services Program determined that the biological integrity of Hinkson Creek was impaired for approximately 14.0 miles below the Interstate 70 bridge crossing. Therefore, it was determined that further water quality work was required to confirm the impairment of the aquatic community and attempt to determine the nature and source(s) of the impairment. The Environmental Services Program’s Water Quality Monitoring Section conducted a study consisting of a combination of biological and chemical monitoring combined with toxicity testing in the upper portion of the impaired segment. Water and sediment samples were collected from mainstem Hinkson Creek and storm drainages located within this portion of Hinkson Creek.

Because the source and type of pollutant(s) were unknown, a water quality triad was used to document impairments to the aquatic community and identify pollutants that are likely contributing to those impairments. The water quality triad is an integrated assessment of information obtained from the aquatic community, chemical analyses, and toxicity testing. The first step in the triad was to document that impairment to the aquatic community still existed. This step was done during the fall of 2001 and spring of 2002 and again in the fall of 2003 and spring of 2004. The next step was to collect and test a variety of instream, stormwater, and sediment samples for toxicity using a bioluminescent microorganism (*Vibrio fischeri*) and in some cases a freshwater daphnid (*Ceriodaphnia*). The purpose of this was to correlate effects of laboratory test organisms with instream effects on the biological community. Toxic samples were further manipulated using Toxicity Identification Evaluation procedures which are standard procedures that allowed us to determine what broad classes of chemical compounds (e.g. metals, organics) might be causing or contributing to the observed toxicity. The final step in the triad was to analyze the toxic samples for the chemical constituents indicated through the Toxicity Identification Evaluation procedures.

Results of this study documented that the aquatic community was, and continues to be, impaired in Hinkson Creek between I-70 and Broadway and the impairment extends downstream. Toxicity tests documented toxicity in approximately 20% of stormwater discharges and in mainstem Hinkson Creek at Broadway. Toxicity Identification Evaluation procedures implicated a variety of urban-associated

chemical constituents including organic chemicals (polycyclic aromatic hydrocarbons, pesticides, petroleum compounds, and metals) in some stormwater discharges and high levels of sodium and calcium chloride in snowmelt samples. Although the presence of chemicals and toxicity of stormwater does not automatically translate to toxicity instream, it does suggest possible contaminants and sources that are likely contributors to instream effects. Instream toxicity was documented in Hinkson Creek at the Broadway bridge during the snowmelt sampling. This observation is significant because it ties instream effects to a particular runoff event.

E. coli counts occasionally exceed recommended levels and may result from a variety of sources. The presence of this fecal bacterium is particularly significant, because as urbanization continues in the Hinkson Creek watershed, human recreational contact with the stream will likely increase.

A visual sediment survey documented increased sediment in the impaired segment of Hinkson Creek compared to upstream estimates. Observations of land disturbance and erosion may explain these observations.

During this first phase of the study, the Department of Natural Resources found it beneficial to release some of the preliminary findings. During spring 2004, preliminary Hinkson Creek data were presented to a variety of entities within the Hinkson Creek watershed. During this time, a number of recommendations were made, such as:

- improve storage and handling of road materials to minimize runoff and prevent movement off site;
- construct more and better designed stormwater control structures that would slow and disperse the flow of stormwater into the stream to reduce scouring and soil erosion;
- make a concerted effort to utilize best management practices to minimize soil erosion when conducting land disturbance activities;
- implement better parking lot management to minimize pollutant export into Hinkson Creek;
- strive to maintain or increase the existing riparian corridor whenever possible.

Releasing preliminary data allowed the entities to look at how business is currently being conducted and take the necessary steps to reduce impacts to Hinkson Creek. The City of Columbia, Public Works is considering a variety of watershed issues and promoting watershed educational efforts. However, improvements can only be made with cooperation from all entities (local government, business owners, and citizens) located within in the Hinkson Creek watershed.